

Claims: I claim:

1. A motion video display comprising:
  - a. a plurality of polarizers with predetermined polarity;
  - b. a plurality of transparent conductive patterning substrates juxtaposed to form a passive-matrix cell structure;
  - c. a cholesteric material having field-maintained bistability with a viewable homeotropic texture and a viewable focal-conic texture;
  - d. a power supply programmed with a video speed driving means;
 wherein the passive-matrix cell structure encases the cholesteric material with its two outside surfaces laminating with polarizers respectively, and with its two inside surfaces binding to the power supply;  
 whereby an optical "ON" state will be displayed in the viewable homeotropic texture area of the cell structure and an optical "OFF" state will be displayed in the viewable focal-conic texture area of the cell structure;  
 whereby the optical "ON" state and the optical "OFF" state are interchangeable in the same area of the cell structure at a motion video speed.
2. The display as in claim 1 wherein the homeotropic "ON" state is an optical wave-guiding state which maintains the phase and polarity of the incoming light.
3. The display as in claim 1 wherein the focal-conic "OFF" state is an optical depolarizing state which changes the phase and polarity of the incoming light.
4. The display as in claim 1 wherein the field-maintained bistability means homeotropic metastable state and focal-conic stable state maintained by a voltage level during the motion video display.
5. The display as in claim 1 wherein the motion video cholesteric display is a high resolution display with a speed of at least 30 frames per second.
6. The display as in claim 1 further including a zero-field cholesteric planar texture as the other optical "ON" state which maintains the phase and polarity of the incoming light within the Bragg reflection band-width.
7. The display as in claim 6 wherein the display has dual working functions: motion video display where the homeotropic texture takes on optical "ON" state when the

20170529 0210

electric power is on, and motionless information display where the planar texture takes on the optical "ON" state when the electric power is off.

8. The display as in claim 6 wherein the homeotropic texture and the planar texture have substantially same optical appearances.
9. The display as in claim 1 wherein the motion video cholesteric display is a reflective display.
10. The display as in claim 1 wherein the motion video cholesteric display is a transmissive display.
11. A video speed driving waveform comprising:
  - a. an erasing pulse with its configuration sufficiently activating at least a portion of display's elements to the homeotropic texture;
  - b. a bias voltage with its configuration sufficiently maintaining the homeotropic texture and the focal-conic texture;
  - c. a "hole" pulse with its configuration sufficiently activating display's elements to focal-conic texture;
  - d. a narrow pulse combined with the "hole" pulse activating display's elements at least partially to homeotropic texture;
  - e. a waveform sequence: first, the frame erasing pulse; second, the bias pulse following the erasing pulse and lasting to the end of the frame except being interrupted by the "hole" pulse; third, the narrow pulse and the "hole" pulse constantly shifting from one row to another, during a frame addressing, with an interval of the narrow pulse pulse-width; fourth, the waveform sequence may or may not being repeated immediately by the next frame;

whereby a video speed display driving scheme with at least 30 frames per second is accomplished.
12. The driving waveform as in claim 11 wherein the erasing pulse is a pulse with the amplitude,  $V_E$ , higher than the cholesteric to field-induced nematic phase change voltage and with the pulse-width in the range of 5-50 milliseconds for the first frame, and 1-5 milliseconds for the following frames.
13. The driving waveform as in claim 11 wherein the bias voltage is  $V_B$ , a maintaining voltage with the amplitude

$$0.1 V_{CN} \leq V_B \leq 0.9 V_{NC},$$

and with the duration

$$T_B = T_F - T_E - \Delta\tau.$$

14. The driving waveform as in claim 11 wherein the “hole” pulse is a negative pulse with the altitude,  $V_B$ , and pulse-width,  $\tau_{NC}$ , in the range of 0.5-1 millisecond.
15. The driving waveform as in claim 11 wherein the narrow pulse is a data “1” pulse with the pulse-width,  $\Delta\tau$ , in the range of 20-60 microseconds.
16. The driving waveform as in claim 11 wherein the waveform sequence may or may not being repeated immediately to the next frame means that if it is repeated immediately to the next frame, there will be a **motion video display** with frame time,

$$T_F = T_{FA} = T_E + \tau_{NC} + n\Delta\tau,$$

and that if it is separated by a display time,  $T_{FD}$ , there will still be a **motion video display** with frame time,

$$T_F = T_{FA} + T_{FD} = T_E + \tau_{NC} + n\Delta\tau + T_{FD},$$

and that if it is separated in a sufficient long period, there will be a **motionless information display** with display time,

$$T_{FD} \gg T_{FA}.$$

17. The driving waveform as in claim 11 wherein the narrow pulse activating display’s elements, at least partially, to homeotropic texture means that the **data “1”** pulse can be amplitude-modulated to achieve a gray-scale display.
18. The driving means as in claim 11 further including a partial driving scheme wherein the row driver generates the whole erasing pulse and major portion of the addressing pulse so that the erasing and addressing can be carried out from any portion of the display.
19. A display driver’s signal logic comprising:
  - a. a plurality of **data “1”** positive single pulse signals;
  - b. a plurality of **data “0”** zero voltage signal;
  - c. a scanning negative single pulse signal;
  - d. a synchronized signal;

whereby a true binary data generates two-dimensionally optical “ON” and “OFF” states on the display’s elements in a video speed.

20. The driver logic signal as in claim 19 wherein the column driver and row driver are TFT driver and STN driver respectively.